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Method and apparatus for magnifying display data generated in computer system.

To magnify display data generated by a lap-top type computer (1) using a magnifying display unit having a transmission type LCD (17) and an OHP apparatus (18), a display control apparatus (16) is set between the laptop type computer (1) and the magnifying display unit. The display control apparatus (16) is connected via an interface (15) to the lap-top type computer (1). The display data is stored in the display control apparatus (16). The stored display data is output to the LCD (17) in a predetermined timing so that it is magnified by the OHP apparatus (18).

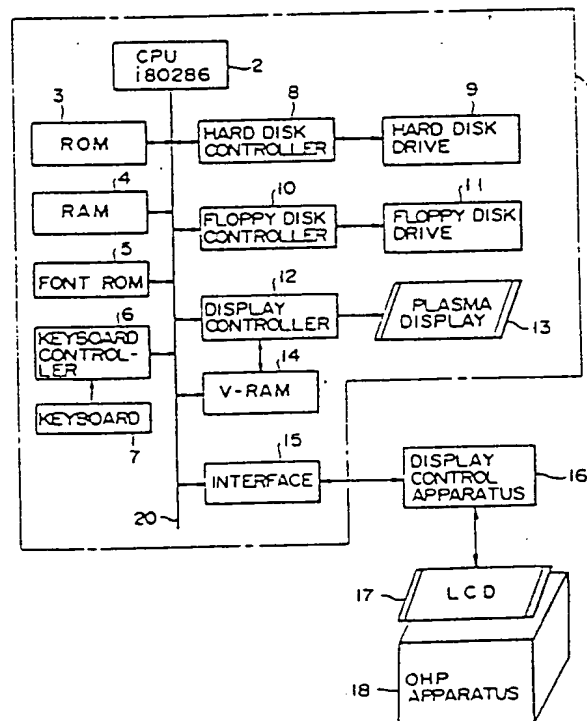


FIG. 1

## Method and apparatus for magnifying display data generated in computer system

The present invention relates to a method for magnifying display data generated in a computer system and apparatus for carrying out the same.

In place of a conventional disk-top type computer, a lap-top type computer which is compact, light in weight and portable has increasingly been used as an office automation equipment and so on.

When a document to be released is prepared utilizing the word-processing function, etc., of the lap-top type computer, a hard copy of the document is taken, for example, by a printer and then the image of the copy is converted by an overhead projector (OHP) to an OHP image. Recently, a combined unit of a transmission type liquid crystal display (LCD) and OHP apparatus has been commercialized. The document generated in lap-top type computer is magnified by connecting the combined unit to the lap-top type computer. It is, therefore, not necessary to prepare an OHP film. This combined unit has only CRT (cathode ray tube) interface.

An ordinary computer has a CRT interface and can utilize the aforementioned combined unit having only CRT interface. The lap-top type computer has a flat panel display, such as an liquid crystal, plasma and electroluminescence (EL) display. However, when the flat panel display is used in the lap-top type computer the combined unit cannot utilize in the lap-top type computer.

If the combined unit is utilized, then it will be necessary to re-design an inner arrangement of the lap-top type computer.

There is a demand for a display image magnifying apparatus which can magnify display data without the need of modifying an inner arrangement of a lap-top type computer equipped with a flat panel display, using a transmission type LCD and an OHP apparatus.

It is accordingly the object of the present invention to provide a method for magnifying display data generated in a computer system and apparatus for carrying out the same.

According to one aspect of the present invention, there is provided a method for magnifying display data generated in a computer system, the method comprising the steps of: generating first display data; outputting driving signals in accordance with the generated first display data; displaying second display data in accordance with the output driving signals; and magnifying the displayed second display data.

According to another aspect of the present invention, there is provided a display system comprising: computer system; outputting means for outputting

driving signals in accordance with the first display data generated by the computer system; display means for displaying second display data in accordance with the driving signals output by the outputting means; and magnifying means for magnifying the second display data displayed by the display means.

This invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a block diagram showing an arrangement of a display system according to one embodiment of the present invention; and

Fig. 2 is a block diagram showing an arrangement of a display control apparatus of the embodiment of the present invention.

The embodiment of the present invention will be explained below with reference to the accompanying drawings.

In Fig. 1, the present system includes lap-top type computer 1, display control apparatus 16, transmission type LCD 17, and OHP apparatus 18.

Lap-top type computer 1 includes central processing unit (CPU) 2 which is made up of i80286 of Intel Corp. (U.S.A.), ROM (Read Only Memory) 3 for storing a program, RAM (Random Access Memory) 4, Font ROM 5, keyboard controller 6, keyboard 7, hard disk controller 8, floppy disk controller 10, display controller 12, V-ROM 14 for storing display data prepared, and interface 15, these are connected to bus 20. Lap-top type computer 1 further includes hard disk drive 9 connected to hard disk controller 8, floppy disk drive 11 connected to floppy disk controller 10, and plasma display 13 connected to display controller 12. Interface 15 is connected to display control apparatus 16 which is connected to LCD 17 on OHP apparatus 18. Display controller 12 is connected to V-RAM 14.

In Fig. 2, display control apparatus 16 is constructed of one-chip CPU 23 made up of i8049 (Intel Corp. U.S.A.) and connected to dual port RAM 21 for storing display data generated in lap-top type computer 1 and to display controller 22 for controlling LCD 17.

The operation of the present invention will be explained below in more detail.

Display data generated by lap-top type computer 1 is written in accordance with a write signal  $\overline{WR}$  into V-RAM 14 and into dual port RAM 21 via interface 15. Display data thus written into dual port RAM 21 is read out by a read signal  $\overline{RD}$  of display controller 22 in accordance with a predetermined

timing and, after being converted to an LCD drive signal, transferred to LCD 17. By the aforementioned operation, the display data generated by lap-top type computer 1 is displayed on transmission type LCD 17 and magnified by OHP apparatus 18. The display data stored in V-RAM 14 is also displayed on plasma display 13, at the same time.

Under the control of CPU 23, the display data on plasma display 13 of lap-top type computer 1 and the display data magnified by OHP apparatus 18 via LCD 17 can be displayed with a delay of a predetermined time.

Although the display system has been explained in connection with the embodiment of the present invention, it is not restricted to the aforementioned embodiment. The present invention can be changed or modified in a variety of ways without departing from the spirit and scope of the present invention.

### Claims

1. A display system characterized by:  
a computer system (1);  
outputting means (16) for outputting driving signals in accordance with first display data generated by the computer system (1);  
display means (17) for displaying second display data in accordance with the driving signals output by the outputting means (16); and  
magnifying means (18) for magnifying the second display data displayed by the display means (17).

2. The system according to claim 1, characterized in that the display means (17) includes a transmission type liquid crystal display.

3. The system according to claim 1, characterized in that the magnifying means (18) includes an overhead projector.

4. The system according to claim 1, characterized in that the computer system (1) includes means (13) for displaying the first display data.

5. The system according to claim 1, characterized in that the outputting means (16) includes:  
storing means (21) for storing first display data transferred from the computer system (1); and  
signal generating (22) means for generating the driving signals in accordance with the first display data stored in the storing means (21).

6. The system according to claim 5, characterized by further comprising controlling means (23) for controlling the storing means (21) and signal generating means (22) in accordance with a predetermined timing.

7. A method for magnifying display data generated in a computer system, the method characterized by the steps of:  
generating first display data;

outputting driving signals in accordance with the generated first display data;  
displaying second display data in accordance with the output driving signals; and  
magnifying the displayed second display data.

8. The method according to claim 7, characterized in that the outputting step includes the steps of:

storing first display data transferred from the computer system; and  
generating driving signals in accordance with the stored first display data.

9. A system for magnifying display data generated in a computer system, the system characterized by:

storing means (21) for storing first display data generated in a computer system (1); and  
generating means (22) for generating the driving signals in accordance with the first display data stored in the storing means (22), thereby displaying second display data corresponding to the first display data in accordance with the driving signals and magnifying the displayed second display data.

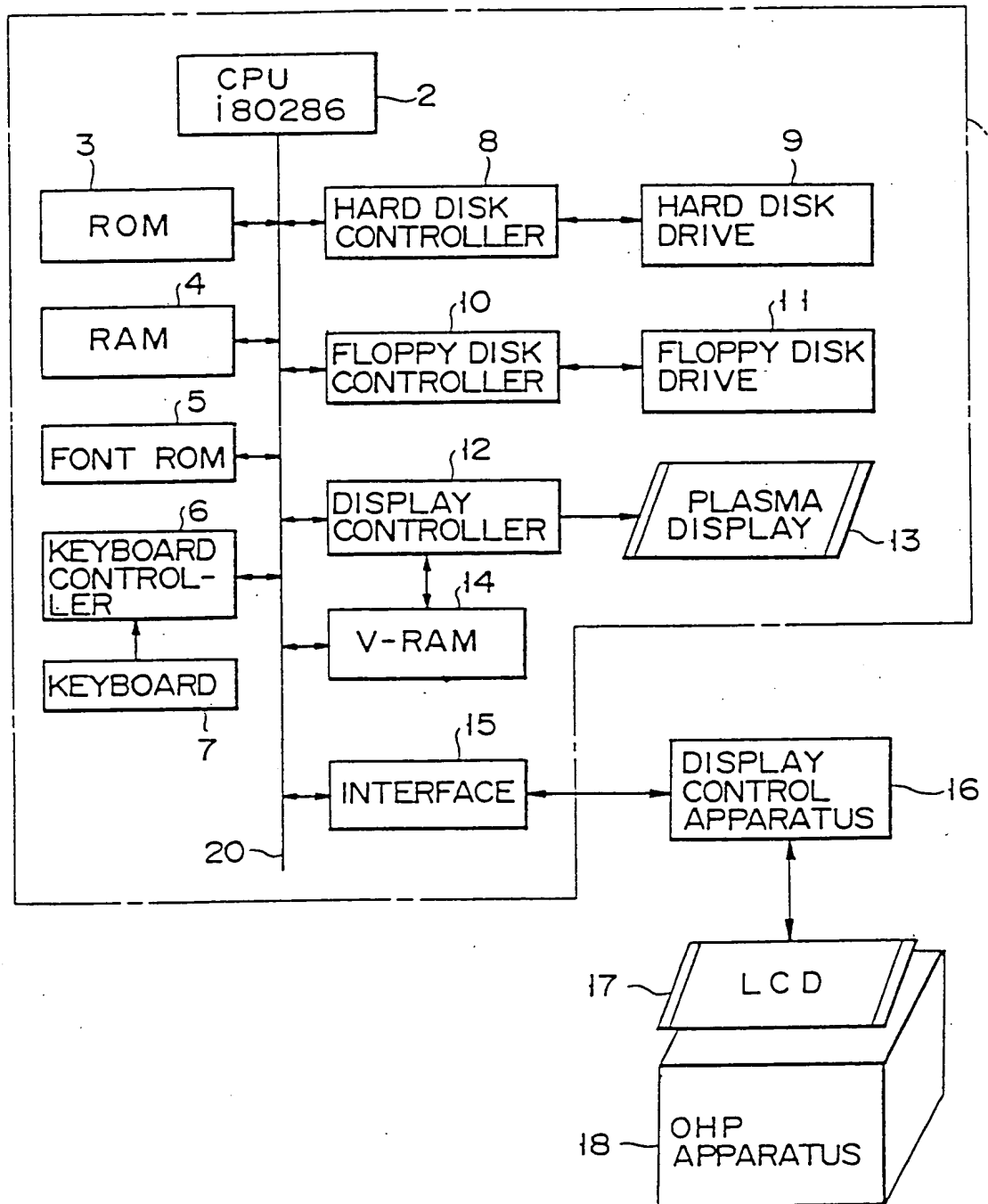


FIG. 1

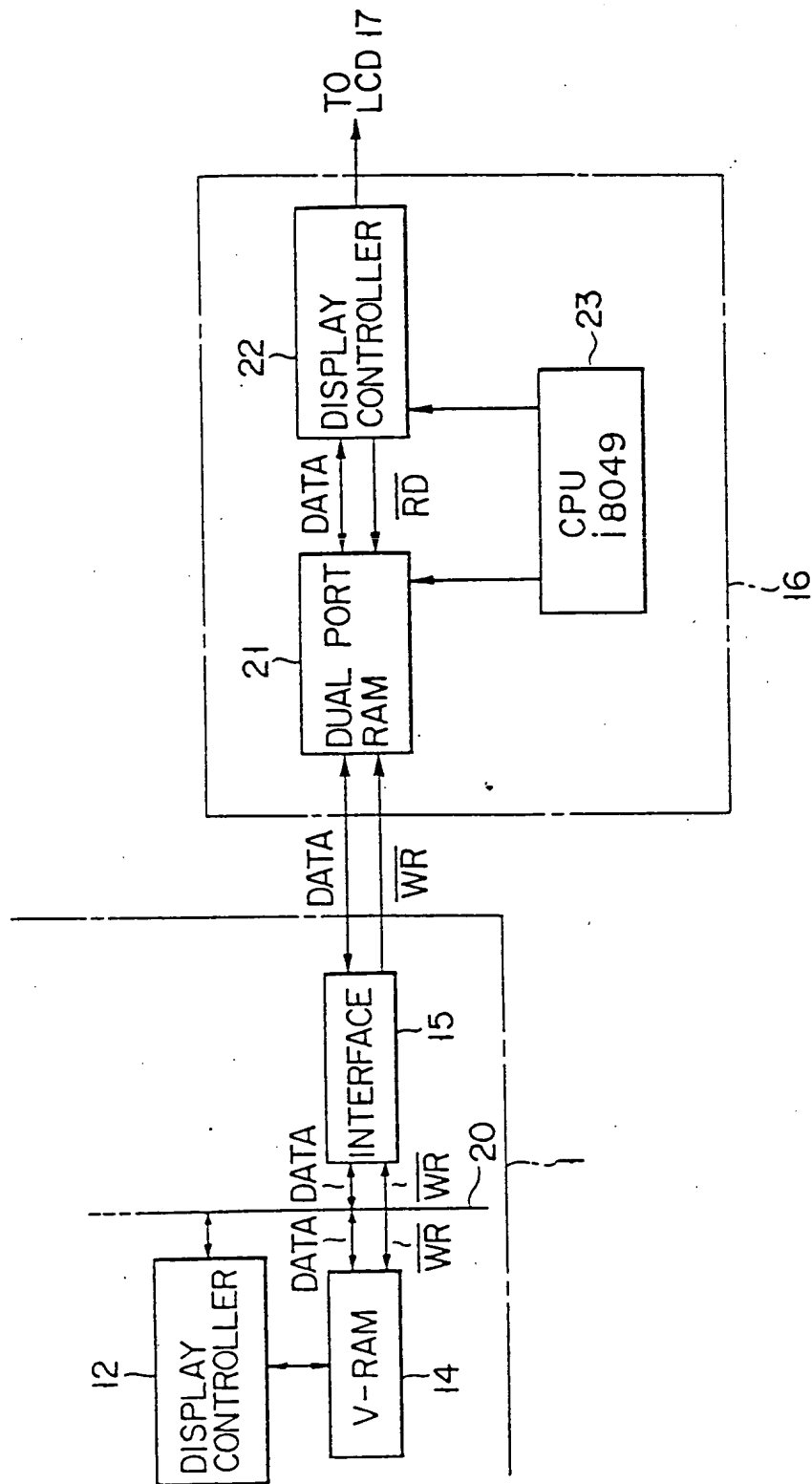


FIG. 2

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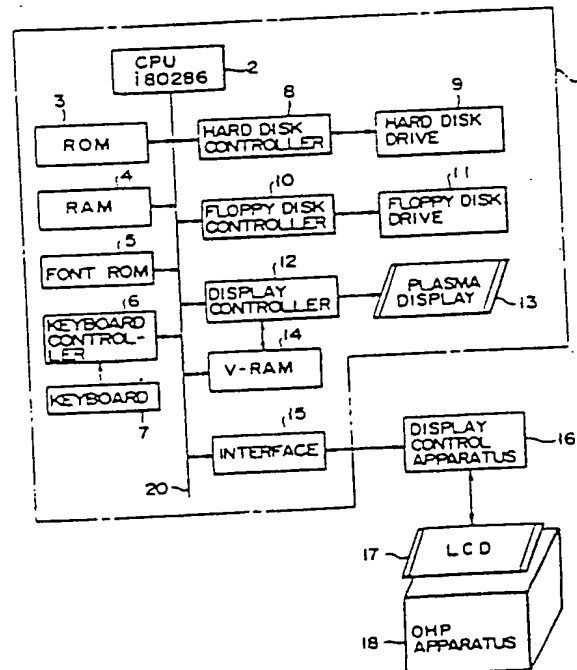


FIG. 1



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	FR-A-2 585 166 (SOPRA) * Page 4, line 14 - page 5, line 33 *	1,3,4,7	G 06 F 3/147
Y	---	2,5,6,8,9	G 09 G 3/02
Y	GB-A-2 089 616 (THE SINGER CO.) * Abstract; figure 1 *	2	
Y	WO-A-8 607 164 (LUSHER et al.) * Page 2, line 3 - page 3, line 6; figure 1 *	5,6,8,9	
A	INFORMATION DISPLAY, vol. 2, no. 7, July 1986, page 8, New York, US; "Graphics imager allows check of designs-in-progress" * The whole document *	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			G 09 G G 06 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-08-1990	Examiner TIBAUD M.J.P.G.
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